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(71) Applicant *(for all designated States except US)*: **UNIVERSITA' DEGLI STUDI "ROMA TRE"** [IT/IT]; Via Ostiense 159, I-00154 Roma (IT).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **CINCOTTI, Gabriella** [IT/IT]; Universita' Degli Studi Roma Tre, Dip. Di Elettronica Applicata, Via Della Vasca Navale 84, I-00146 Roma (IT).

(74) Agents: **SCILLETTA, Andrea** et al.; Ing. Barzano' & Zanardo Roma S.p.A., Via Piemonte, 26, I-00187 Roma (IT).

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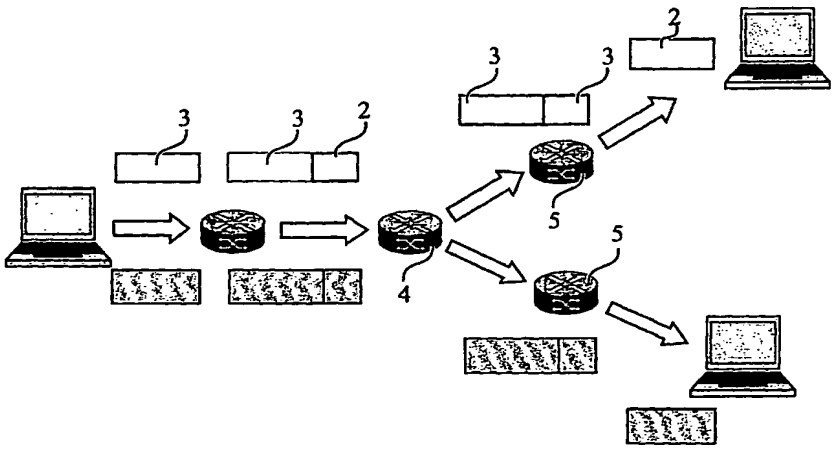
(54) Title: OPTICAL DEVICE FOR SIMULTANEOUSLY GENERATING AND PROCESSING OPTICAL CODES

$$|T_{sk}(f)| = \prod_{v=0}^{V-1} \left| F_v\left(a_v f + \frac{S_{sk}}{N_k \tau}\right) \right| \qquad (I)$$



(57) Abstract: The invention relates to an optical device, apt to generate and process optical codes at least one wavelength, comprising *P*inputs s, with $1 \leq s \leq P$, and $P \geq 1$, and N outputs k, with $1 \leq k \leq N$ and $N \geq 1$, characterised in that it is apt to simultaneously generate and process $N_c \geq 2$, made of C chips with time interval τ, with $C \geq 2$, characterised in that the transfer function T_{sk} (f) from the input s to the output k satisfies the following formula: where: F_v is a transfer function of an optical filter, for v=0,1..., V-1, a_v is a constant value, for v=0,1,..., V-1 S_{sk} is an integer number ($S_{sk} \varepsilon Z$), N_k is a constante value, for k=2,...N, and V is a positive integer number with $1 \leq V \leq \log_2 N$. The invention further relates to a set of optical codes, apt to be generated, in particular, by such optical device, and to networks and apparatus comprising such optical device.

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